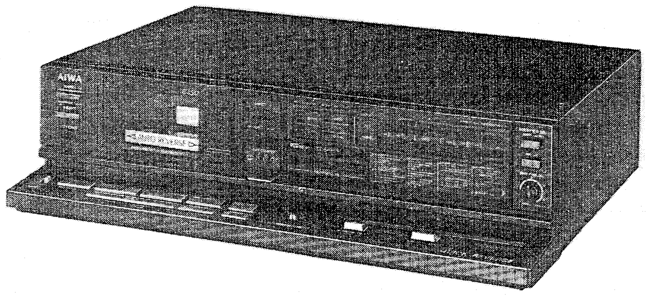
AIWA®

S/M Code No. 84-025
DATE OF ISSUE 9/1984

SERVICE MANUAL

MODEL NO.
AD-R450

STEREO CASSETTE
DECK



TYPE. HB,HUB,HJB,CB,EB,KB,GB,Z

SPECIFICATIONS

Type	Stereo cassette tape deck
Track format	4 tracks 2 channels
Power supply	**AD-R450 E, Z** AC 220 V, 50/60 Hz **AD-R450 K, G** AC 240 V, 50/60 Hz **AD-R450 U, C** AC 120 V, 60 Hz **AD-R450 H, HU, HJ** AC 120 V/220 V-240 V switchable, 50/60 Hz
Power consumption	15 W
Frequency response	METAL tape: 20−18,000 Hz CrO$_2$ position tape: 20−17,000 Hz NORMAL tape: 20−16,000 Hz
Signal-to-noise ratio	73 dB (METAL tape DOLBY C NR ON)
Wow and flutter	According to DIN 45 500 0.1% 0.04% (WRMS)
Tape speed	4.8 cm/sec. (1-7/8 ips)
Rewind time	70 sec. (C-60)
Fast forward time	70 sec. (C-60)

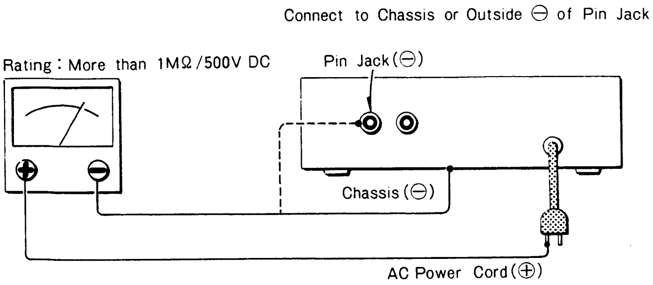
Recording system	AC bias (frequency 85 kHz)
Erase system	AC erase
Motor	DC Servomotor × 1, DC Motor × 1
Head	DX head
Inputs	LINE IN maximum input sensitivity: 50 mV (over 50 kΩ) DIN max sensitivity (Z model only): 0.1 mV/kΩ (3.3 kΩ)
Outputs	LINE OUT standard output level: 0.4 V (0 VU); suitable load impedance: over 50 kΩ; DIN standard level (Z model only): 0.4 V (0 VU) Headphones: 8−32 Ω
Dimensions	420(W) × 110(H) × 300(D) mm
Weight	4.4 kg
Accessories	Stereo pin cord (2)

- Design and specifications are subject to change without notice.
- Noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.
- Dolby and the ᗡD symbol are trademarks of Dolby laboratories licensing corporation.

Follow the instructions carefully, which will allow the user to optimise the products' performance and give many years of serivce.

1. **No scratch and melting shall be made to covered lead-wires of an a.c. primary circuit including mains leads.**
2. **No illegibility shall be given to the specification plate, the caution labels, the fuse labels and others.**
3. **When, on pattern sides of circuit boards, additional repair-parts have been made up, the parts shall be firmly glued to circuit boards or other components, unless the parts can be attached firmly.**
4. **The following matters shall be maintained as they are, when repairing.**
   1) Soldering of lead-wire ends
      - * Care should be taken of the space distance in an a.c. primary circuit as well as soldering.
   2) Wiring and holding of lead-wires with wire-clips and binders
   3) Materials of lead-wires
      - * e.g.; For UL models, lead-wires to be used shall be approved or accepted by the UL.
   4) Location of all kinds of insulators
   5) Setting of voltage selector switch
      - * Set the Voltage Selector Switch to 240V, 220V, or 120V, According to your Local Voltage.
5. **After repaired, the insulation resistance or leakage current shall be measured with 500 ± 5V D.C and shall be not less than 1MΩ.**

Measuring Point


Connect to Chassis or Outside ⊖ of Pin Jack
Rating : More than 1MΩ/500V DC
Pin Jack(⊖)
⊕
⊖
Chassis (⊖)
AC Power Cord(⊕)

6. General instructions for mechanism repair

1) The heads, capstan and pinch roller shall be cleaned of good quality alcohol after repaired, because dirty heads shall cause distorted sounds while dirty capstan and pinch roller shall occur wow/flutter and take-up fault.
2) When oiling, only one or two drops shall be applied so as not to run over and be dispersed. Note should be taken of the metal fitting for the capstan and rotating portions of the idlers and pinch roller, especially.
3) E-rings and poly slider washers shall be replaced with new ones, if once those have been removed. – No re-utilization due to unreliability.
4) Regular spare-parts shall always be used for repair, because using irregular parts and tampering with the products shall cause deterioration, mulfunction and damage.

ELECTRICAL MAIN PART LIST

- ★-mark means less required items and availabilities may be limited.

<IC>

Symbol No.	Part No.	Description
	87-027-879	AN6882
	87-020-260	BA12003
	87-020-261	LA6358S
⚡	82-197-641	LC6502B-639
	87-020-140	L78M12
	87-027-895	M5218L
	87-927-986	NJM4560S
⚡	87-027-937	TC4030BP

<TRANSISTOR>

Symbol No.	Part No.	Description
	82-109-521	2SA952K
	89-110-155	2SA1015GR
	89-309-457	2SC945LK
	89-318-156	2SC1815BL
	89-318-155	2SC1815GR
	89-322-406	2SC2240BL
	89-328-785	2SC2878A, B
	89-408-805	2SD880GR
	89-413-023	2SD1302S, T

<MAIN CIRCUIT BOARD SECTION>

Symbol No.	Part No.	Description
PCB-A	*	MAIN CIRCUIT BOARD
D411,412, 413,414, 701,702, 703,705	87-027-097	DIODE, 1S1555
D601,602, 603,604, 706	82-596-799	DIODE, IN4002 (H, HU, HJ, C, U only)
D601,602, 603,604	87-027-083	DIODE, IS1885 (E, K, G, Z only)
D704	87-020-123	DIODE, DS446
L351,352	82-135-631	TRAP COIL, 85K
L353,354	87-003-109	COIL, 5.6mH
L401	82-194-632	BIAS OSC COIL, 85K
L501,502	82-135-632	MPX FILTER, 85K
L701	82-196-649	OSC COIL, LC6502
S501	87-031-788	PUSH SWITCH (DOLBY B-C NR ON/OFF)
S502	87-031-787	PUSH SWITCH (DOLBY NR B-C SELECTOR)
SFR301, 302	87-021-734	SFR, 100Ω-B
SFR351, 352, 501, 502	87-021-743	SFR, 22kΩ-B
SFR353, 354	87-021-745	SFR, 47kΩ-B (Z only)
SFR411 412	87-021-745	SFR, 47kΩ-B
VR401	82-135-643	VOLUME, 50kΩ-B (BIAS FINE)

<Resistor>

Symbol No.	Part No.	Description
⚠FR601	87-029-361	3.3Ω 1/2W FUSE RESISTOR

<Capacitor>

Symbol No.	Part No.	Description
C301,302, 501,502	87-015-951	1μF 50V ELECTROLYTIC LL
C305,306	87-018-040	470pF CERAMIC
C309,310, 701	87-018-044	1000pF CERAMIC
C365,366	87-018-043	820pF CERAMIC
C401,402	87-018-034	150pF CERAMIC
C411	87-014-071	3900pF 100V PP
C413	87-018-137	3300pF CERAMIC
C505,506	87-010-231	220μF 10V ELECTROLYTIC
C507,508	87-012-105	0.022μF 16V CERAMIC
C601	88-336-230	2200μF 25V ELECTROLYTIC
C602	87-010-232	220μF 16V ELECTROLYTIC
C603	87-010-049	330μF 25V ELECTROLYTIC
C606,607	89-663-815	0.01μF 25V CERAMIC
C704	87-010-139	47μF 10V ELECTROLYTIC BP

<DISPLAY CIRCUIT BOARD SECTION>

Symbol No.	Part No.	Description
PCB-B	*	DISPLAY CIRCUIT BOARD
D801,802, 803,804, 805,806, 817,819	87-027-542	LED, LN217RP (8POINT PEAK PROGRAM METER, C-TYPE, METAL)
D807,808, 809,810, 811,812, 813,814, 815,816, 818,821	87-027-543	LED, LN317GP (8POINT PEAK PROGRAM METER, B-TYPE, NORMAL)
D820	87-027-671	LED, LN417YP (CrO_2)
D822,823	87-020-329	LED, SLP284C-51U (▶, ◀)
D824,825, 826	87-020-142	LED, SLP984A-51 (⇆, ⊃, ↻)
D827	87-027-097	DIODE, 1S1555

<KEY BOARD CIRCUIT BOARD SECTION>

Symbol No.	Part No.	Description
PCB-C	*	KEY BOARD CIRCUIT BOARD
D831,832	87-027-732	LED, SG235D (RVS PLAY, PLAY)
D833	87-027-733	LED, SY435D (PAUSE)
D834,835	87-027-731	LED, SR535D (REC MUTE, RECORD)
D841,842, 843,844, 845,846, 847,848, 849,850	87-027-097	DIODE, 1S1555
S841	87-031-850	SLIDE SWITCH (REVERSE MODE)
S842	87-031-849	SLIDE SWITCH (TIMER)
S843,844, 845,846, 847,848, 849,850	87-031-863	TACT SWITCH [REW (▶▶), F.F. (◀◀), PLAY, REV PLAY, RECORD, STOP, PAUSE, REC MUTE]

<SWITCH CIRCUIT BOARD SECTION>

Symbol No.	Part No.	Description
PCB-D	*	SWITCH CIRCUIT BOARD

Symbol No.	Part No.	Description
J881	★87-049-297	JACK, 6.3ø (HEADPHONES)
⚠S881	87-031-805	PUSH SWITCH (POWER)

<PIN JACK CIRCUIT BOARD SECTION> =EXCEPT FOR Z

Symbol No.	Part No.	Description
PCB-E	*	PIN JACK CIRCUIT BOARD
J1,2,3,4	★87-049-420	PIN JACK, 4P (LINE IN/REC, LINE OUT/PLAY)

<VOLUME CIRCUIT BOARD SECTION>

Symbol No.	Part No.	Description
PCB-F	*	VOLUME CIRCUIT BOARD
VR871	82-135-641	SLIDE VOLUME, 50kΩ-A (RECORD LEVEL)
VR872	82-135-642	SLIDE VOLUME, 150kΩ-W (REC BALANCE)

<AUTO STOP CIRCUIT BOARD SECTION>

Symbol No.	Part No.	Description
PCB-G	*	AUTO STOP CIRCUIT BOARD
CPL901	87-045-644	PHOTO SENSOR, NJL5141EA

<SENSOR CIRCUIT BOARD SECTION>

Symbol No.	Part No.	Description
PCB-H	*	SENSOR CIRCUIT BOARD
CPL902	87-045-644	PHOTO SENSOR, NJL5141EA

<TERMINAL CIRCUIT BOARD SECTION> =E, K, G, Z only

Symbol No.	Part No.	Description
PCB-I	82-135-607	TERMINAL CIRCUIT BOARD

<DOLBY-NR CIRCUIT BOARD SECTION>

Symbol No.	Part No.	Description
	87-020-132	DOLBY UNIT HA12058J (W/PCB-J)

<DIN CIRCUIT BOARD SECTION>=Z only

Symbol No.	Part No.	Description
PCB-K	82-160-667	DIN CIRCUIT BOARD
D21	87-020-123	DIODE, DS446
RY1	84-184-612	LEAD RELAY HA212N
J1,2,3,4, 21,S21	★87-038-054	JACK PLATE A'ssy (LINE IN/REC, LINE OUT/PLAY, DIN REC/PLAY, INPUT SELECTOR)

<Capacitor>

Symbol No.	Part No.	Description
C3,4	87-018-040	470pF CERAMIC
C7,8	87-018-012	15pF CERAMIC

<MISCELLANEOUS>

Symbol No.	Part No.	Description
⚠PT951	82-135-611	POWER TRANSFORMER (H, HU, HJ only)
⚠PT951	82-135-612	POWER TRANSFORMER (C, U only)
⚠PT951	82-135-613	POWER TRANSFORMER (E, Z only)
⚠PT951	82-135-614	POWER TRANSFORMER (K, G only)
RPH, EH	81-505-601	HEAD RP/E HD425-RV

Symbol No.
M901
M902
SOL901, 902, 903
⚠
⚠
⚠
⚠
⚠
⚠
⚠
S901,904, 905
S902,903
S906,907, 908
⚠S951

⚠ Safety c

This symbol i

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safety specific

this symbol, m

C-MOS IC ha

The C-MOS IC

by static elect

ing articles.

1. Need to be
   and to be
   deposit.
2. To use sol
   consumptic
   second.
3. Do not per
   the circuit
4. The ICs o
   MOS IC s

Symbol No.	Part No.	Description
M901	87-045-135	MOTOR, DC/EG
M902	81-505-604	REEL MOTOR
SOL901, 902, 903	81-505-603	SOLENOID, 9ME-A
⚠	★87-034-958	AC POWER CORD (H, HU, HJ only)
⚠	★87-034-578	AC POWER CORD (C, U only)
⚠	★82-187-797	AC POWER CORD (E, Z only)
⚠	★82-187-796	AC POWER CORD (K only)
⚠	★82-187-795	AC POWER CORD (G only)
⚠	★87-085-184	AC CORD BUSHING (H, HU, HJ, C, U only)
⚠	★87-085-185	AC CORD BUSHING (E, K, G, Z only)
S901,904, 905	81-505-607	LEAF SWITCH(REC ENA FWD, CASSETTE, REC ENA RVS)
S902,903	81-505-602	LEAF SWITCH (70μs/120μs, MT)
S906,907, 908	81-505-601	LEAF SWITCH(PAUSE, PLAY, DIRECTION)
⚠S951	87-031-853	ROTARY SWITCH (VOLTAGE SELECTOR) (H, HU, HJ only)

⚠ Safety component symbol

This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

C-MOS IC handling precaution

The C-MOS IC's construction makes this part susceptible to damage by static electricity and so take sufficient care in regard to following articles.

1. Need to be put on conductive sheet, to be put in a metallic box and to be wrapped by aluminium foil for transportation and deposit.
2. To use solder iron less than 40W (less than 260℃) of power consumption for soldering. But do not overheat more than 10 second.
3. Do not perform a conductivity test with a tester, etc. Refer to the circuit voltages of each part.
4. The ICs on the electrical parts which are indicated by an C-MOS IC symbol mark (⊕).

Note; Combination Circuit Board

The parts on the electrical parts list which are indicated by an asterisk (*) are supplied as one single combined circuit board. Therefore, they will not be supplied separately. If this becomes necessary, please order the entire circuit board.

Combination circuit board 82-135-601

PCB-A	**82-135-602**
PCB-B	**82-135-603**
PCB-C	**82-135-604**
PCB-D	**82-135-605**
PCB-E	**82-135-606**
PCB-F	**82-135-608**
PCB-I	**82-135-607**

Combination circuit board 81-506-611

PCB-G	**81-506-612**
PCB-H	**81-506-614**

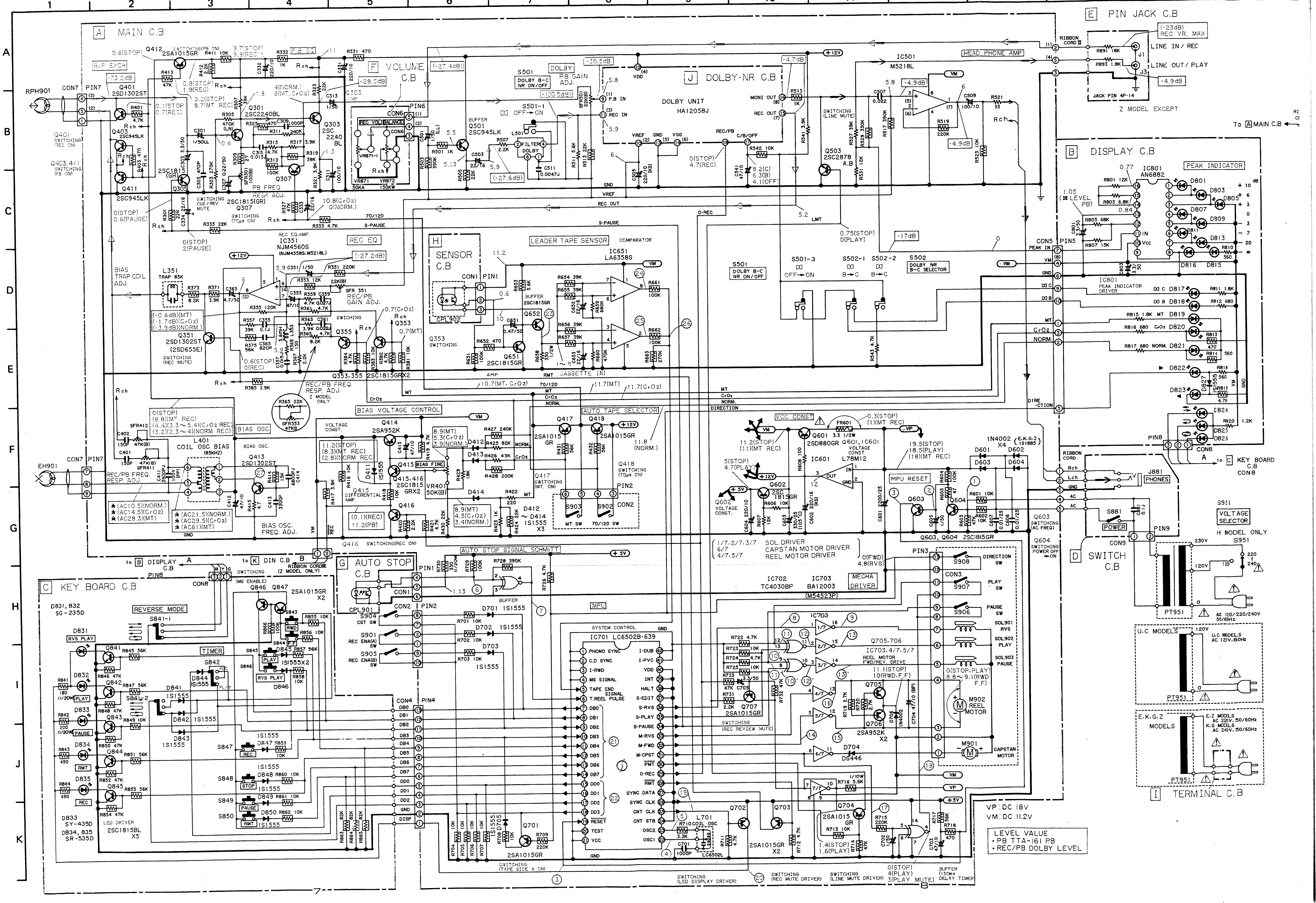
Practical Service Figure

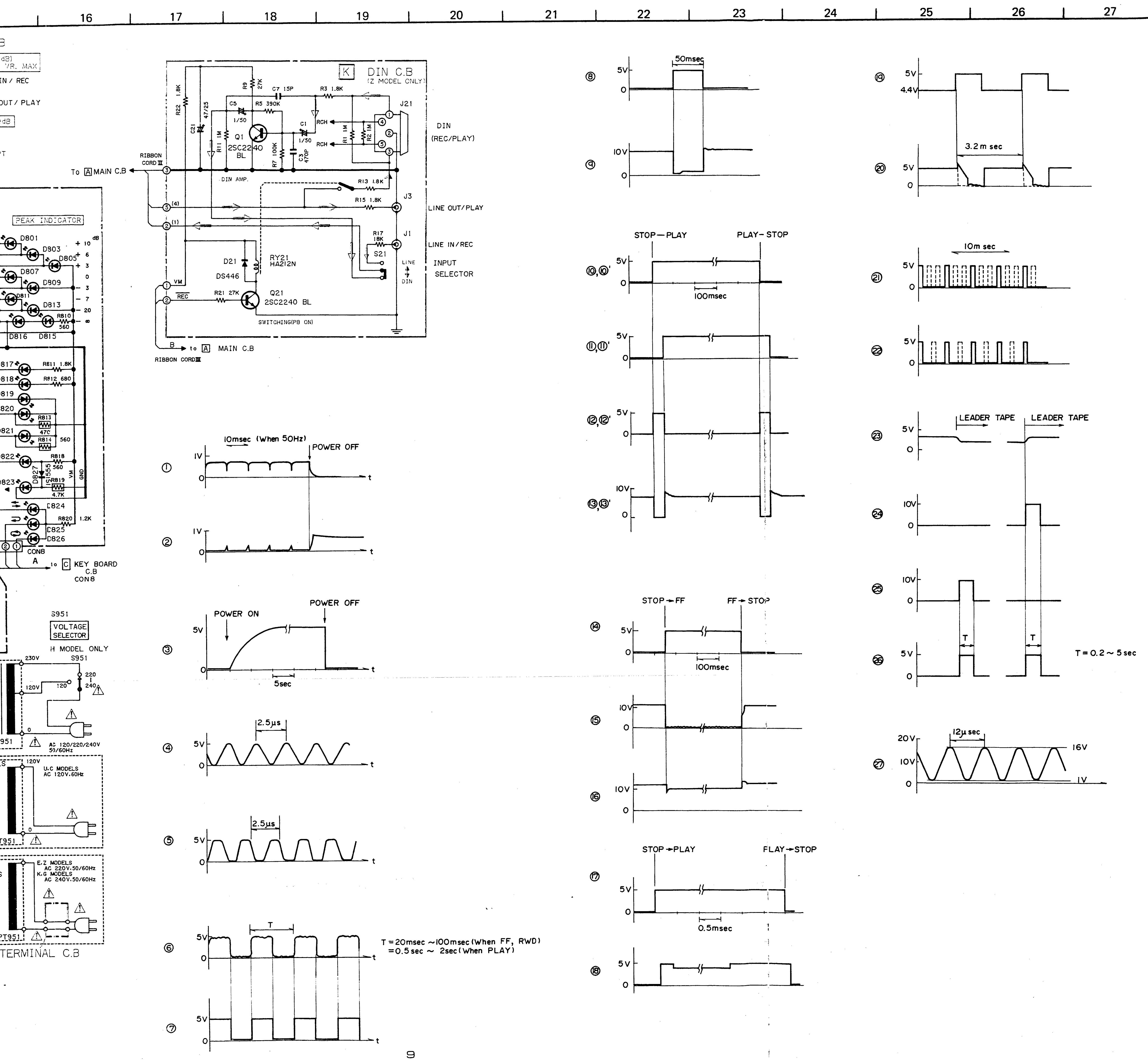
Wow and flutter:	According to DIN 45500 0.1% Less than 0.045% (WRMS)
Pinch roller pressure:	215±25g (2.1±0.24N)
Take-up torque:	35^{+15}_{-5} g-cm (3.4 $^{+1.5}_{-0.49}$ mN·m)
FF and rewind torque:	120~180g-cm (11.8~17.6mN·m)
Playback output: (TTA-161)	540±20mV [LINE OUT, DIN OUT (Z only)]
REC/PB output: (400Hz, 0VU, TTA-119J)	+0.5±1.0dB [LINE OUT, DIN OUT (Z only)]
REC/PB distortion: (400Hz)	Less than 2.5% (NORMAL)
Playback noise:	Less than 3.0mV (NORMAL, 120μS, DOLBY-NR OFF)
REC/PB SN ratio:	
(Unweighted)	More than 45dB (NORMAL, DOLBY-NR OFF)
(WTD-A)	More than 45dB (NORMAL, DOLBY-NR OFF)
Erasing ratio: (125Hz)	More than 55dB
Bias frequency:	85kHz
Frequency response:	

	30~60Hz	100~650Hz	1kHz	2~10kHz	13kHz	15kHz	16kHz
METAL	$^{+3}_{-6}$dB	±3dB	0dB	±3dB	$^{+3}_{-4}$dB	$^{+3}_{-4.6}$dB	$^{+3}_{-5}$dB
CrO₂					$^{+3}_{-4.3}$dB	$^{+3}_{-5}$dB	—
NORMAL					$^{+3}_{-5}$dB	—	—

Input level/impedance:	LINE IN maximum input sensitivity: 50mV (over 50kΩ) DIN maximum sensitivity (Z only): 0.1mV/kΩ (3.3kΩ)
Output level/impedance:	LINE OUT standard output level: 0.4V (0VU). suitable load impedance: over 50kΩ DIN standard level (Z only): 0.4V (0VU) Headphones: 8－32Ω
Test tape:	METAL TTA-119MX NORMAL TTA-119J CrO₂ TTA-119G

SCHEMATIC DIAGRAM—1 (AD-R450 HB, HUB, HJB, CB, EB, KB, GB, Z models)


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
A B C D E F G H I J K
A MAIN C.B
F VOLUME C.B
J DOLBY-NR C.B
DOLBY UNIT HA12058J
E PIN JACK C.B
LINE IN / REC
LINE OUT / PLAY
JACK PIN 4P-14
Z MODEL EXCEPT
IC501 M5218L
HEAD PHONE AMP
B DISPLAY C.B
IC801 AN6882
PEAK INDICATOR
H SENSOR C.B
CPL902
LEADER TAPE SENSOR
COMPARATOR
IC651 LA6358S
REC EQ
IC351 NJM4560S
(NJM4558S,M5218L)
BIAS TRAP COIL ADJ.
BIAS OSC
L401 COIL OSC BIAS
BIAS OSC. FREQ. ADJ.
BIAS VOLTAGE CONTROL
AUTO TAPE SELECTOR
VCC CONST
IC601 L78M12
MPU RESET
RPH901
EH901
REC/PB FREQ. RESP. ADJ.
REC/PB GAIN ADJ.
PB FREQ. RESP. ADJ.
S501 DOLBY B-C NR ON/OFF
S502 DOLBY NR B-C SELECTOR
C KEY BOARD C.B
REVERSE MODE
TIMER
G AUTO STOP C.B
CPL901
AUTO STOP SIGNAL SCHMITT
MPU
SYSTEM CONTROL
IC701 LC6502B-639
IC702 TC4030BP
IC703 BA12003
MECHA DRIVER
(M54523P)
SOL DRIVER
CAPSTAN MOTOR DRIVER
REEL MOTOR DRIVER
M902 REEL MOTOR
M901 CAPSTAN MOTOR
D SWITCH C.B
S881 POWER
S951 VOLTAGE SELECTOR
H MODEL ONLY
PT951
U.C MODELS
E.K.G.Z MODELS
I TERMINAL C.B
J881 PHONES
To A MAIN C.B
to C KEY BOARD C.B CON8
to B DISPLAY C.B
to K DIN C.B
VP: DC 18V
VM: DC 11.2V
LEVEL VALUE
• PB TTA-161 PB
• REC/PB DOLBY LEVEL

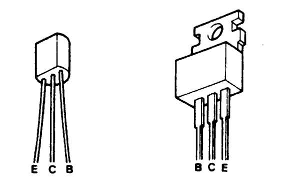

16
17
18
19
20
21
22
23
24
25
26
27
K DIN C.B
(Z MODEL ONLY)
R22 1.8K
C21 47/25
R9 27K
C7 15P
R3 1.8K
C5 1/50
R5 390K
R11 1M
Q1 2SC2240 BL
R7 100K
C3 470P
C1 1/50
RCH
RCH
R1 1M
R2 1M
J21
DIN (REC/PLAY)
RIBBON CORD II
To A MAIN C.B
DIN AMP.
R13 1.8K
R15 1.8K
J3
LINE OUT/PLAY
R17 18K
J1
LINE IN/REC
S21
LINE ↕ DIN
INPUT SELECTOR
D21 DS446
RY21 HA212N
VM
REC
R21 27K
Q21 2SC2240 BL
SWITCHING(PB ON)
B → to A MAIN C.B
RIBBON CORD III
(dB) VR. MAX
IN / REC
OUT / PLAY
dB
PEAK INDICATOR
D801
D803
D805
D807
D809
D811
D813
R810 560
D816
D815
dB
+ 10
+ 6
+ 3
0
− 3
− 7
− 20
− ∞
D817
R811 1.8K
D818
R812 680
D819
D820
R813 470
D821
R814 560
D822
R818 560
D827 1S1555
R819 4.7K
VM
GND
D823
D824
R820 1.2K
D825
D826
CON8
A → to C KEY BOARD C.B CON8
S951
VOLTAGE SELECTOR
H MODEL ONLY
230V
S951
220
240
120V
120
AC 120/220/240V 50/60Hz
120V
U.C MODELS AC 120V,60Hz
E.Z MODELS AC 220V,50/60Hz
K.G MODELS AC 240V,50/60Hz
T951
TERMINAL C.B
①
10msec (When 50Hz)
POWER OFF
1V
0
t
②
1V
0
t
③
POWER ON
POWER OFF
5V
0
5sec
t
④
2.5μs
5V
0
t
⑤
2.5μs
5V
0
t
⑥
T
5V
0
t
T = 20msec ~ 100msec (When FF, RWD)
= 0.5 sec ~ 2sec (When PLAY)
⑦
5V
0
t
⑧
50msec
5V
0
⑨
10V
0
STOP—PLAY
PLAY-STOP
⑩,⑩'
5V
0
100msec
⑪,⑪'
5V
0
⑫,⑫'
5V
0
⑬,⑬'
10V
0
STOP→FF
FF→STOP
⑭
5V
0
100msec
⑮
10V
0
⑯
10V
0
STOP→PLAY
PLAY→STOP
⑰
5V
0
0.5msec
⑱
5V
0
⑲
5V
4.4V
3.2 m sec
⑳
5V
0
10m sec
㉑
5V
0
㉒
5V
0
LEADER TAPE
LEADER TAPE
㉓
5V
0
㉔
10V
0
㉕
10V
0
㉖
T
T
5V
0
T = 0.2 ~ 5 sec
㉗
12μ sec
20V
10V
0
16V
1V

NOTES:

1) ▒ B (+) power supply
2) ⇛ Signal path
   ⇨ Rec path
3) The voltage is the reference value measured with a tester (20 k-ohms/V DC) when there are no signals.
   But ( ) is with recording.
   An asterisk (*) indicates that the value was measured with a vacuum-tube voltmeter during recording.
4) Resistors with no designation have a rated power of 1/8W and a tolerance of ±5%.
5) Capacitors with no designation have a dielectric strength of less than 50WV.
6) The only capacitor tolerance indicated are ±5% (J) and ±10% (K).
7) Ceramic capacitor symbols:
   - ○|├ For temperature compensation (SL)
   - ┤├ High dielectric constant system (YY)
   - ┤├ High dielectric constant system (YW, YP, YZ)
   - ●|├ Semiconductor ceramic
   - ⊗|├ For temperature compensation (SH)
8) Explanation of symbols
   - Ⓜ Mylar capacitor
   - Ⓐ Aluminum solid capacitor
   - (PP) Polypropylene film capacitor
   - (BP) Bi-polarized capacitor
   - (LL) Low-leakage capacitor
   - ⏛ Printed resistor
   - ⏛ Fuse resistor

⚠ Safety component symbol
This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications.
Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

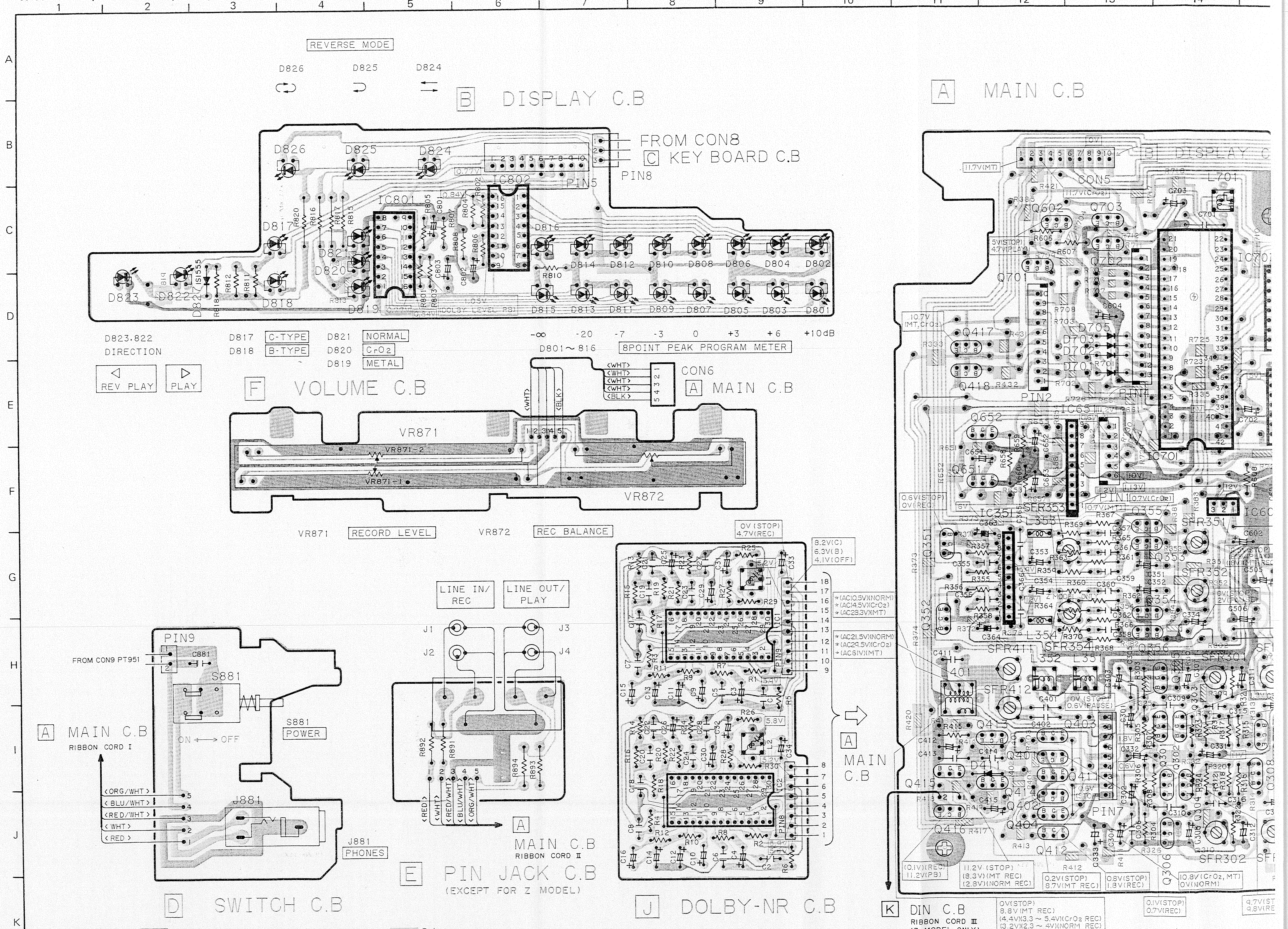
- This schematic diagram is subject to change without notice in the interests of improved performance.



2SA952
2SA1015
2SC945
2SC1815
2SC2240
2SC2878
2SD1302

2SD880

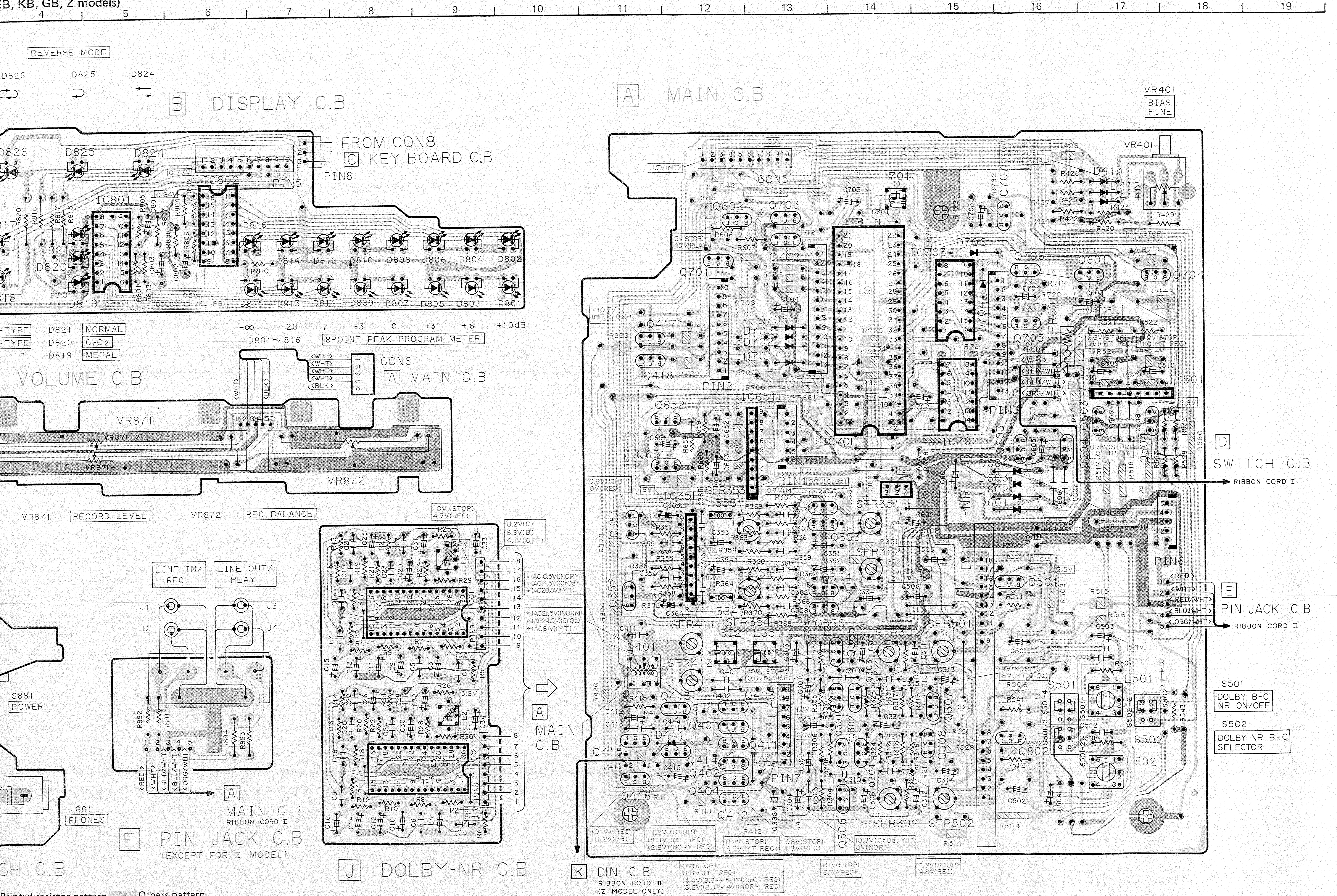
WIRING–1 (AD-R450 HB, HUB, HJB, CB, EB, KB, GB, Z models)


REVERSE MODE
D826
D825
D824
B DISPLAY C.B
FROM CON8
C KEY BOARD C.B
PIN8
PIN5
IC801
IC802
D823.822 DIRECTION
REV PLAY
PLAY
D817 C-TYPE
D818 B-TYPE
D821 NORMAL
D820 CrO2
D819 METAL
-∞ -20 -7 -3 0 +3 +6 +10dB
D801～816 8POINT PEAK PROGRAM METER
F VOLUME C.B
CON6
A MAIN C.B
VR871
VR871-2
VR871-1
VR872
VR871 RECORD LEVEL
VR872 REC BALANCE
PIN9
FROM CON9 PT951
S881
S881 POWER
ON ⟷ OFF
A MAIN C.B
RIBBON CORD I
J881
J881 PHONES
D SWITCH C.B
LINE IN/ REC
LINE OUT/ PLAY
J1
J2
J3
J4
A MAIN C.B
RIBBON CORD II
E PIN JACK C.B
(EXCEPT FOR Z MODEL)
J DOLBY-NR C.B
A MAIN C.B
A MAIN C.B
K DIN C.B
RIBBON CORD III
(Z MODEL ONLY)
IC701
IC351
CON5
PIN1
PIN2
PIN7

NOTES (1) ▨ Earth pattern ▨ Printed resistor pattern ▨ Others pattern

(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals.
An asterisk (*) indicates that the value was measured with a vacuum-tube voltmeter during recording.

The ICs on the electrical parts which are indicated by an C-MOS IC symbol mark (⊛).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REVERSE MODE
D826
D825
D824
B DISPLAY C.B
FROM CON8
C KEY BOARD C.B
PIN5
PIN8
IC801
IC802
D816
D814
D812
D810
D808
D806
D804
D802
D815
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D809
D807
D805
D803
D801
D821
D820
D819
-TYPE
-TYPE
D821 NORMAL
D820 CrO2
D819 METAL
-∞ -20 -7 -3 0 +3 +6 +10dB
D801～816
8POINT PEAK PROGRAM METER
CON6
A MAIN C.B
VOLUME C.B
VR871
VR871-2
VR871-1
VR872
VR871 RECORD LEVEL
VR872 REC BALANCE
LINE IN/ REC
LINE OUT/ PLAY
J1
J2
J3
J4
S881 POWER
J881 PHONES
A MAIN C.B RIBBON CORD II
E PIN JACK C.B
(EXCEPT FOR Z MODEL)
CH C.B
0V (STOP) 4.7V(REC)
8.2V(C) 6.3V(B) 4.1V(OFF)
IC1
IC2
PIN9
PIN8
A MAIN C.B
J DOLBY-NR C.B
A MAIN C.B
VR401 BIAS FINE
CON5
IC701
IC702
IC703
IC601
IC651
IC351
IC501
L701
D SWITCH C.B
RIBBON CORD I
E PIN JACK C.B
RIBBON CORD II
S501 DOLBY B-C NR ON/OFF
S502 DOLBY NR B-C SELECTOR
K DIN C.B
RIBBON CORD III
(Z MODEL ONLY)
SFR301
SFR302
SFR351
SFR352
SFR353
SFR354
SFR411
SFR412
SFR501
SFR502
0V(STOP) 8.8V(MT REC) (4.4V)(3.3～5.4V)(CrO2 REC) (3.2V)(2.3～4V)(NORM REC)
0.1V(STOP) 0.7V(REC)
4.7V(STOP) 4.9V(REC)
(0.1V)(REC) 11.2V(PB)
11.2V (STOP) (8.3V)(MT REC) (2.8V)(NORM REC)
0.2V(STOP) 8.7V(MT REC)
0.9V(STOP) 1.8V(REC)
10.8V(CrO2, MT) 0V(NORM)

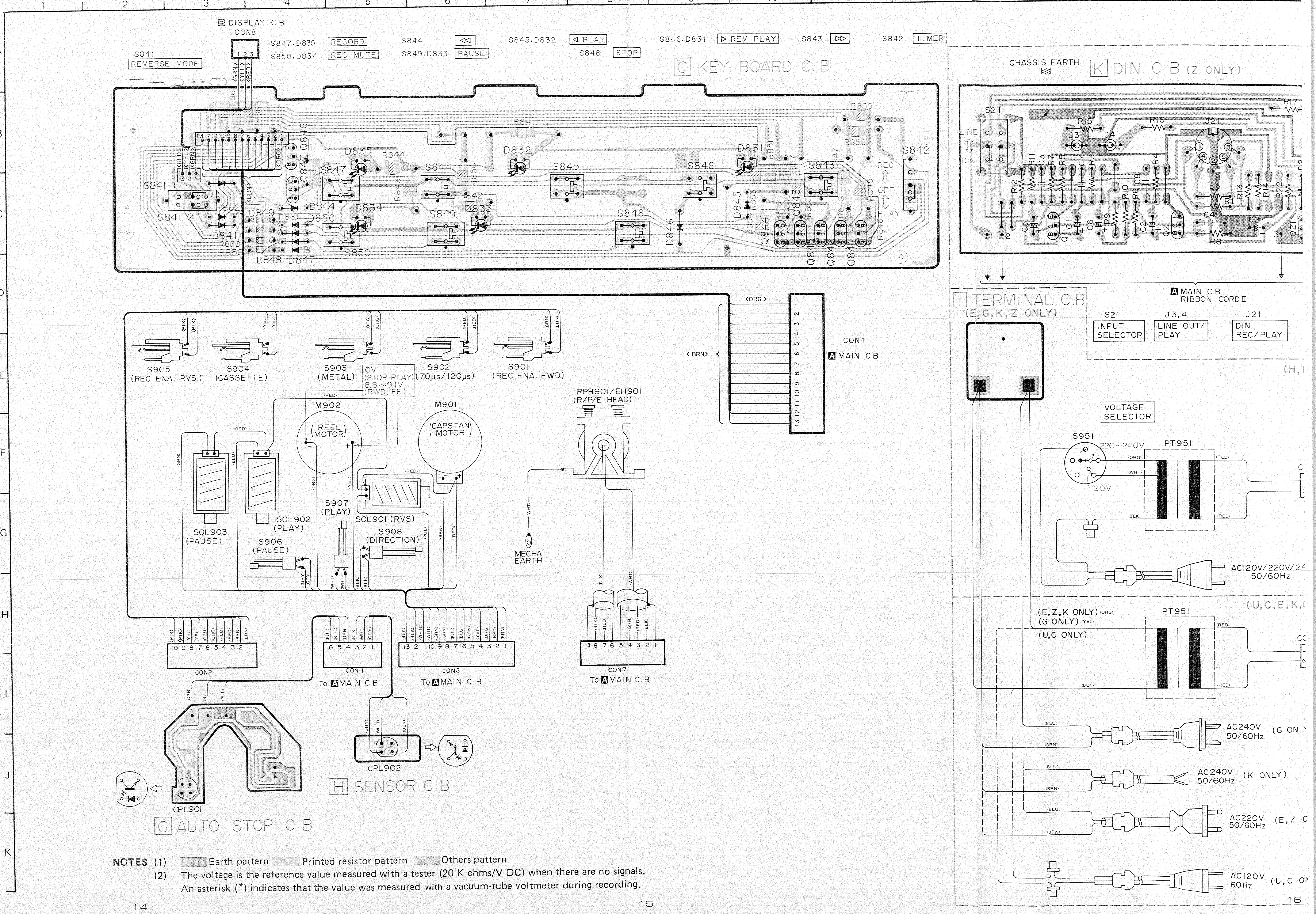
▨ Printed resistor pattern ▨ Others pattern

e value measured with a tester (20 K ohms/V DC) when there are no signals.

at the value was measured with a vacuum-tube voltmeter during recording.

The ICs on the electrical parts which are indicated by an C-MOS IC symbol mark ( ).

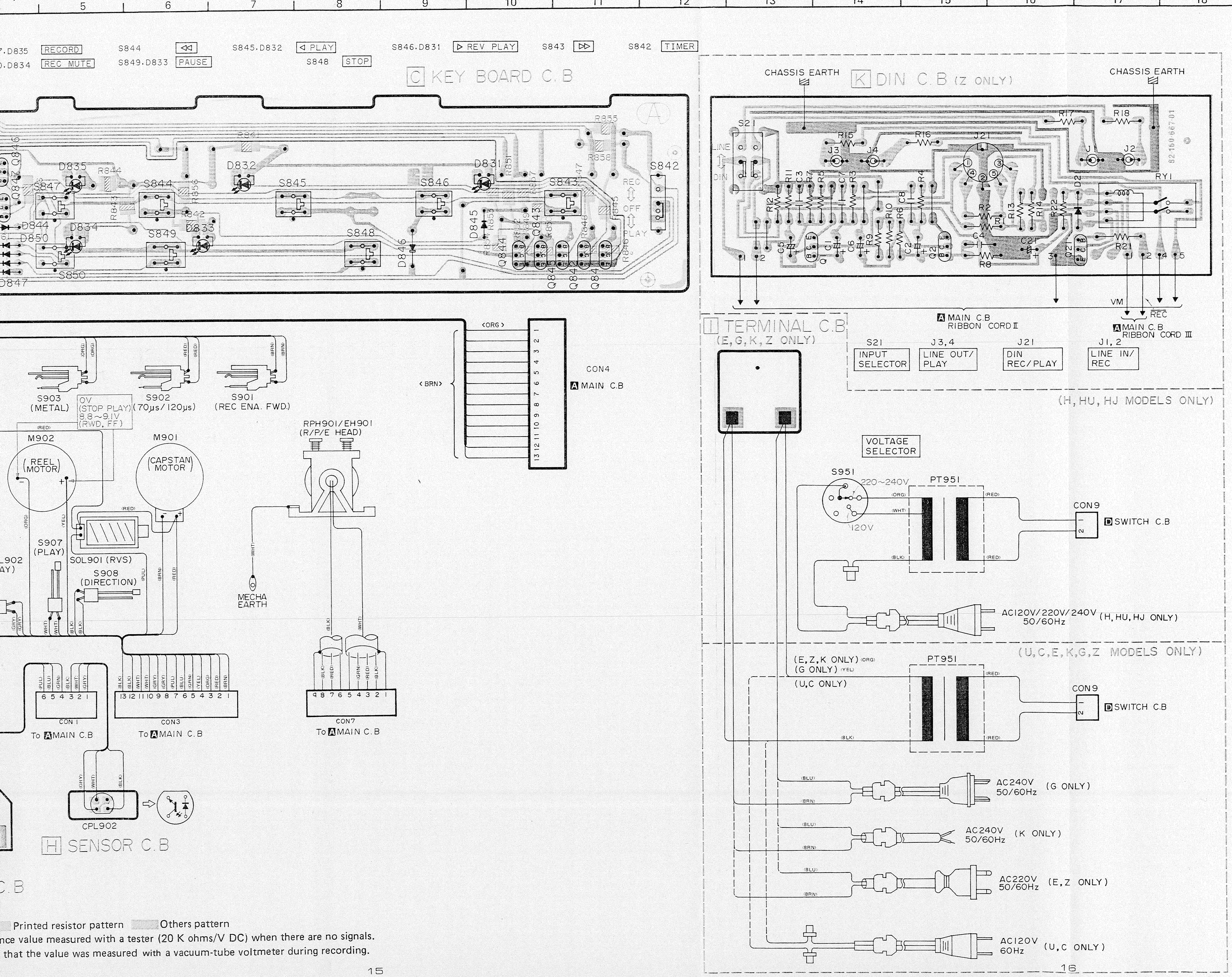
WIRING–2 (AD-R450 HB, HUB, HJB, CB, EB, KB, GB, Z models)


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
A B C D E F G H I J K
B DISPLAY C.B
CON8
S841
REVERSE MODE
S847.D835 RECORD
S850.D834 REC MUTE
S844 ◁◁
S849.D833 PAUSE
S845.D832 ◁ PLAY
S848 STOP
S846.D831 ▷ REV PLAY
S843 ▷▷
S842 TIMER
C KEY BOARD C.B
CHASSIS EARTH
K DIN C.B (Z ONLY)
S841-1
S841-2
D835 D832 D831 S842
S847 S844 S845 S846 S843
D844 D850 D834 D833 D845 D846
S849 S848 S850
D849 D841 D848 D847
REC OFF PLAY
LINE DIN
S21 J3 J4 J21
R15 R16 R17 R11 R12 R2 R13 R14 R22 R8
Q1 Q2 Q21 C4 C21
A MAIN C.B RIBBON CORD II
I TERMINAL C.B (E,G,K,Z ONLY)
S21 INPUT SELECTOR
J3,4 LINE OUT/PLAY
J21 DIN REC/PLAY
CON4
A MAIN C.B
S905 (REC ENA. RVS.)
S904 (CASSETTE)
S903 (METAL)
S902 (70μs/120μs)
S901 (REC ENA. FWD.)
0V (STOP PLAY) 8.8~9.1V (RWD, FF)
M902 REEL MOTOR
M901 CAPSTAN MOTOR
RPH901/EH901 (R/P/E HEAD)
SOL903 (PAUSE)
SOL902 (PLAY)
S907 (PLAY)
SOL901 (RVS)
S906 (PAUSE)
S908 (DIRECTION)
MECHA EARTH
CON2
CON1 To A MAIN C.B
CON3 To A MAIN C.B
CON7 To A MAIN C.B
CPL901
G AUTO STOP C.B
CPL902
H SENSOR C.B
VOLTAGE SELECTOR
S951
220~240V
120V
PT951
AC120V/220V/24
50/60Hz
(H,
(E,Z,K ONLY) (ORG)
(G ONLY) (YEL)
(U,C ONLY)
(U,C,E,K,
AC240V 50/60Hz (G ONL
AC240V 50/60Hz (K ONLY)
AC220V 50/60Hz (E,Z
AC120V 60Hz (U,C O

NOTES (1) ▨ Earth pattern ▨ Printed resistor pattern ▨ Others pattern

(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals. An asterisk (*) indicates that the value was measured with a vacuum-tube voltmeter during recording.

GB, Z models)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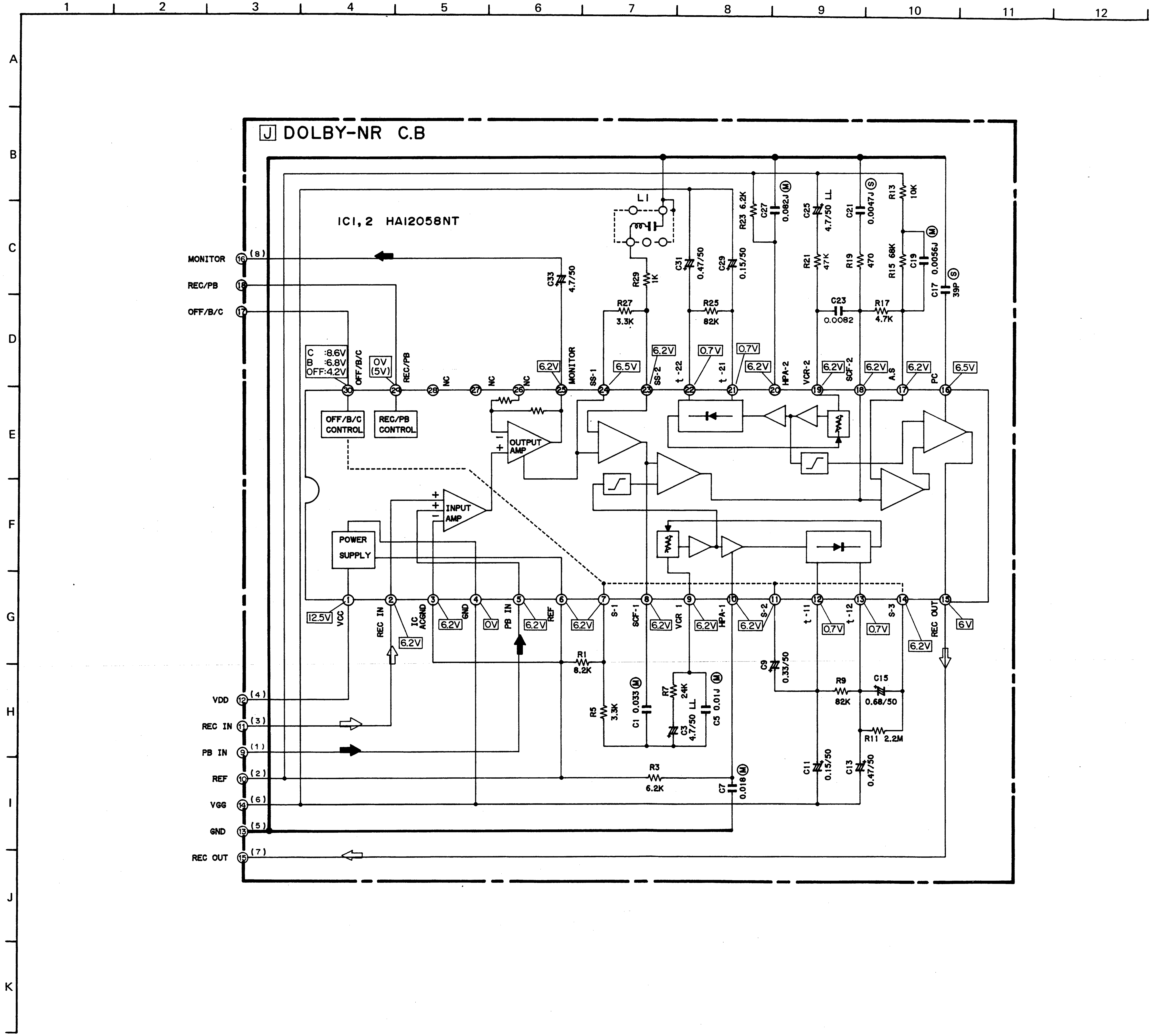
7.D835 RECORD
0.D834 REC MUTE
S844 ⊲⊲
S849.D833 PAUSE
S845.D832 ⊲ PLAY
S848 STOP
S846.D831 ⊳ REV PLAY
S843 ⊳⊳
S842 TIMER
C KEY BOARD C.B
D835
D834
D850
D844
D847
S847
S850
S844
S849
D832
D833
S845
S848
S846
D831
D845
D846
S843
S842
REC
OFF
PLAY
R844
R843
R842
R841
R855
R856
Q844
Q843
CHASSIS EARTH
K DIN C.B (Z ONLY)
CHASSIS EARTH
S21
LINE
DIN
R15
R16
J21
J3
J4
J1
J2
R17
R18
RY1
R2
R1
R8
R21
R22
C4
C21
Q21
Q1
Q2
VM
REC
A MAIN C.B RIBBON CORD II
A MAIN C.B RIBBON CORD III
I TERMINAL C.B (E,G,K,Z ONLY)
S21 INPUT SELECTOR
J3,4 LINE OUT/PLAY
J21 DIN REC/PLAY
J1,2 LINE IN/REC
(H,HU,HJ MODELS ONLY)
VOLTAGE SELECTOR
S951
220~240V
120V
PT951
CON9
D SWITCH C.B
AC120V/220V/240V 50/60Hz (H,HU,HJ ONLY)
(U,C,E,K,G,Z MODELS ONLY)
(E,Z,K ONLY)
(G ONLY)
(U,C ONLY)
PT951
CON9
D SWITCH C.B
AC240V 50/60Hz (G ONLY)
AC240V 50/60Hz (K ONLY)
AC220V 50/60Hz (E,Z ONLY)
AC120V 60Hz (U,C ONLY)
CON4
A MAIN C.B
S903 (METAL)
OV (STOP PLAY) 8.8~9.1V (RWD, FF)
S902 (70μs/120μs)
S901 (REC ENA. FWD.)
M902 (REEL MOTOR)
M901 (CAPSTAN MOTOR)
RPH901/EH901 (R/P/E HEAD)
S907 (PLAY)
SOL901 (RVS)
S908 (DIRECTION)
L902 (PLAY)
MECHA EARTH
CON1 To A MAIN C.B
CON3 To A MAIN C.B
CON7 To A MAIN C.B
CPL902
H SENSOR C.B
C.B

Printed resistor pattern ▨ Others pattern

nce value measured with a tester (20 K ohms/V DC) when there are no signals.

that the value was measured with a vacuum-tube voltmeter during recording.

SCHEMATIC DIAGRAM–2 (AD-R450 HB, HUB, HJB, CB, EB, KB, GB, Z models)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J
K
J DOLBY-NR C.B
IC1, 2 HA12058NT
MONITOR 16 (8)
REC/PB 18
OFF/B/C 17
VDD 12 (4)
REC IN 11 (3)
PB IN 9 (1)
REF 10 (2)
VGG 14 (6)
GND 13 (5)
REC OUT 15 (7)
L1
C33 4.7/50
R29 1K
R27 3.3K
C31 0.47/50
C29 0.15/50
R25 82K
R23 6.2K
C27 0.082J Ⓜ
C25 4.7/50 LL
C21 0.0047J Ⓢ
R13 10K
R21 47K
R19 470
R15 68K
C19 0.0056J Ⓜ
C17 39P Ⓢ
C23 0.0082
R17 4.7K
C :8.6V
B :6.8V
OFF:4.2V
0V (5V)
OFF/B/C
REC/PB
NC
NC
NC
MONITOR
SS-1
SS-2
t-22
t-21
HPA-2
VCR-2
SCF-2
A.S
PC
6.2V
6.5V
6.2V
0.7V
0.7V
6.2V
6.2V
6.2V
6.2V
6.5V
OFF/B/C CONTROL
REC/PB CONTROL
OUTPUT AMP
INPUT AMP
POWER SUPPLY
12.5V
VCC
REC IN
IC ACGND
GND
PB IN
REF
S-1
SCF-1
VCR 1
HPA-1
S-2
t-11
t-12
S-3
REC OUT
6.2V
6.2V
0V
6.2V
6.2V
6.2V
6.2V
6.2V
0.7V
0.7V
6.2V
6V
R1 8.2K
R5 3.3K
C1 0.033 Ⓜ
R7 24K
C3 4.7/50 LL
C5 0.01J Ⓜ
C9 0.33/50
R9 82K
C15 0.68/50
R11 2.2M
R3 6.2K
C7 0.018 Ⓜ
C11 0.15/50
C13 0.47/50

ADJUSTMENT

8. Bias Oscillation Frequency Adjustment

Settings: • Adjustment location: L401

Method: Set up the REC mode, and adjust L401 for 85kHz.

6. REC/PB Frequency Response Adjustment

Settings:
- Test tape: TTA-119J
- Test point: LINE OUT
- Input: LINE IN: 1 kHz & 10 kHz, 33 dB
- Dolby NR SW: OFF
- Adjustment location: SFR411 (Lch)
SFR412 (Rch)

Method: Record the 1 kHz & 10 kHz, 33 dB signals and adjust the REC volume for 40 mV output, then play back the recorded tape and adjust so that the output difference between 1 kHz and 10 kHz is 0.5 ± 0.5 dB or less.

7. REC/PB Frequency Response Adjustment (Z MODEL ONLY)

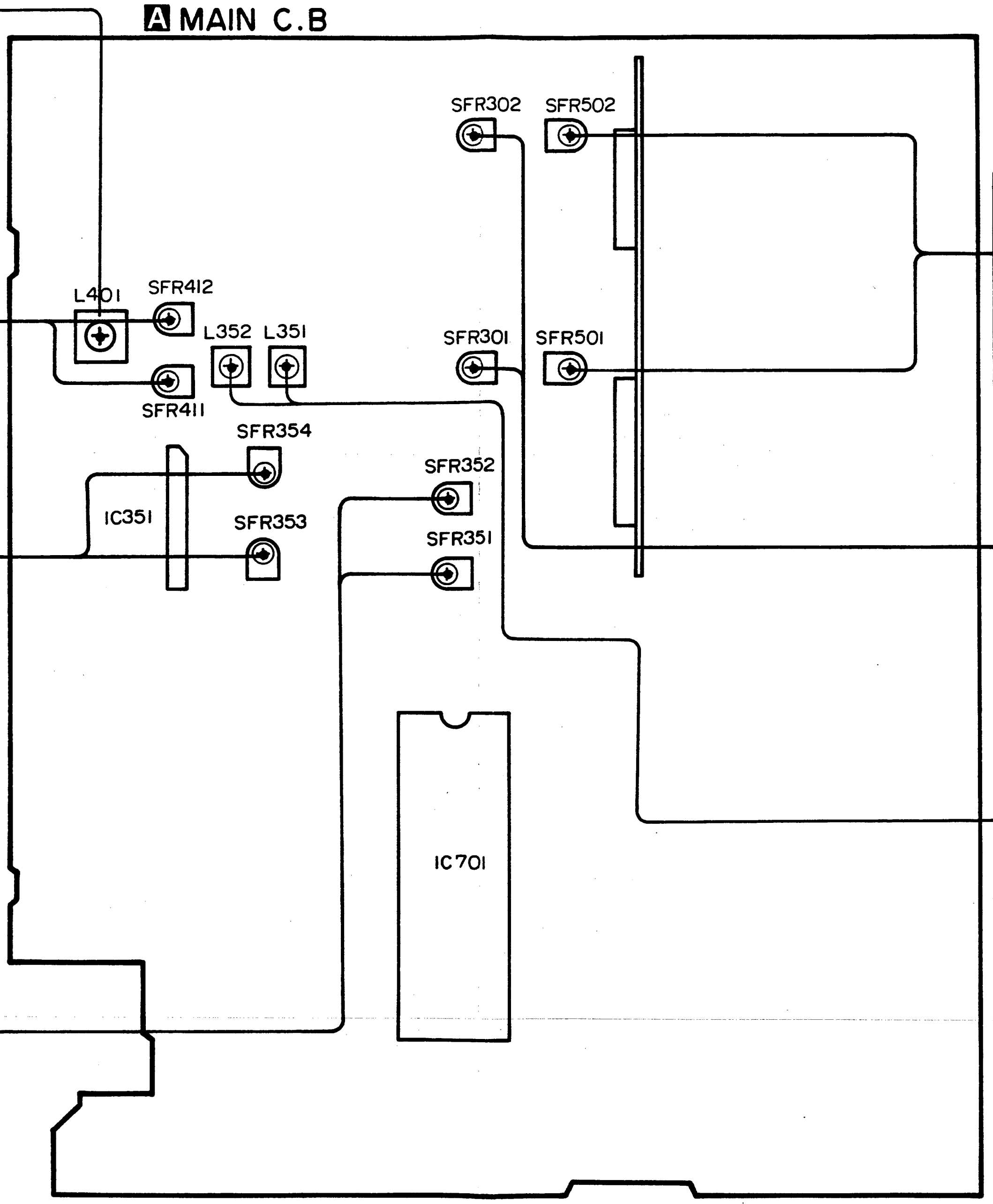
Settings:
- Test tape: TTA-119D
- Test point: LINE OUT
- Input: LINE IN: 1 kHz 10 kHz, 33 dB
- Dolby NR SW: OFF
- Adjustment location: SFR353 (Lch)
SFR354 (Rch)

Method: Record the 1 kHz & 10 kHz, 33 dB signals and adjust the REC volume for 40 mV output, then play back the recorded tape and adjust so that the output difference between 1 kHz and 10 kHz is 0.5 ± 0.5 dB or less.

5. REC/PB Gain Adjustment

Settings:
- Test tape: TTA-119J
- Test point: LINE OUT
- Input: LINE IN: 1 kHz, 33 dB
- Dolby NR SW: OFF
- Adjustment location: SFR351 (Lch)
SFR352 (Rch)

Method: Record the 1 kHz, 33 dB signal and adjust the REC volume for 40 mV output, then play back the recorded tape and adjust so that the output difference is 0 ~ +0.5 dB compared with the REC mode.



3. PB Gain Adjustment

Settings:
- Test tape: TTA-161
- Test point: LINE OUT
- Dolby NR SW: OFF
- Adjustment location: SFR501 (Lch)
SFR502 (Rch)

Method: Adjust so that the output is 540 ± 10 mV.

4. PB Frequency Response Adjustment

Settings:
- Test tape: TTA-317E
- Test point: LINE OUT
- Dolby NR SW: OFF
- Adjustment location: SFR301 (Lch)
SFR302 (Rch)

Method: Play back the test tape, then adjust so that the output difference between 1 kHz and 10 kHz is 0.5 ± 0.5 dB or less.

9. Bias Trap Coil Adjustment

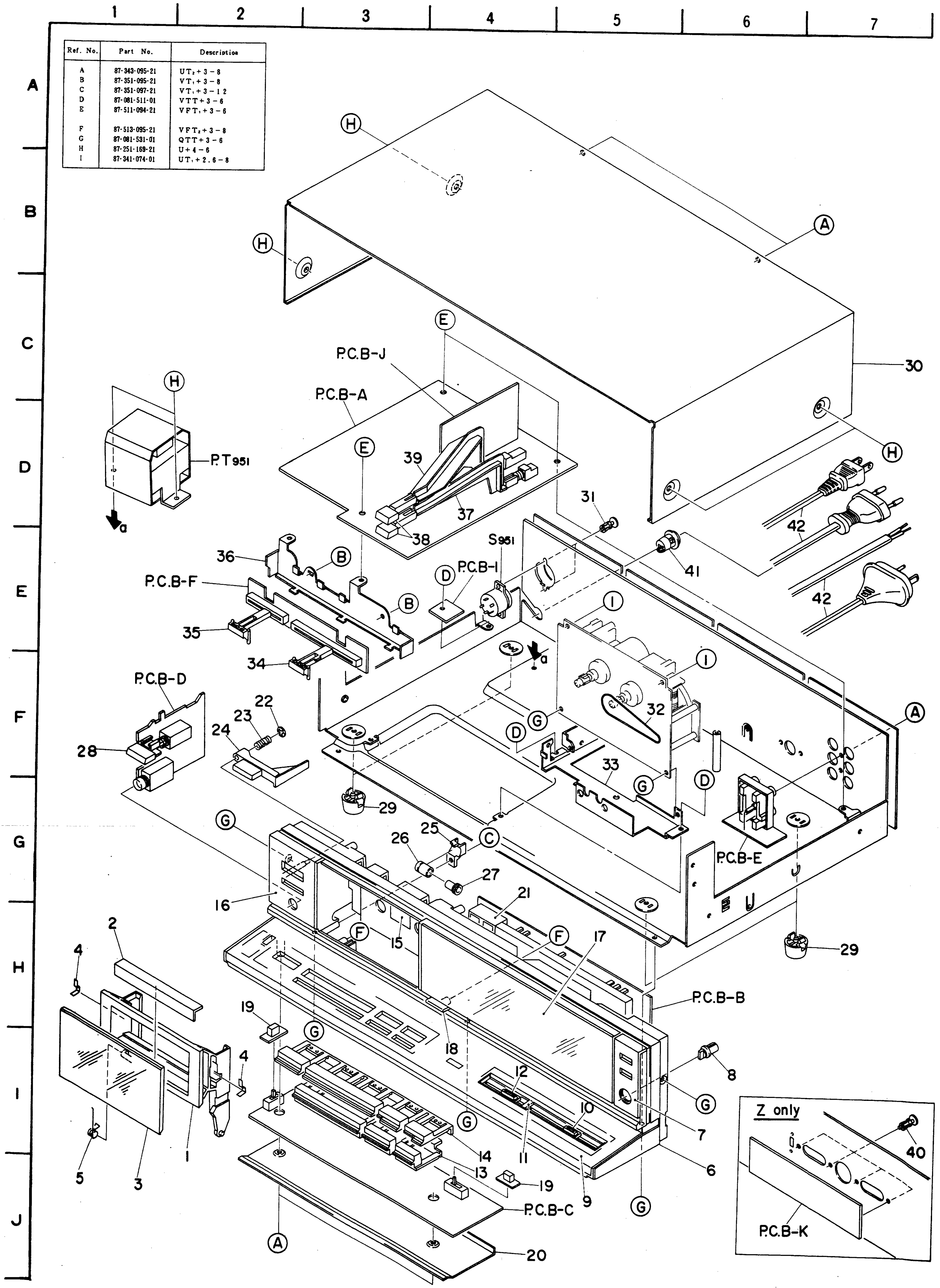
Settings: • Adjustment location: L351 (Lch)
L352 (Rch)

Method: Adjust L351, 352 for minimum leakage.

☆ **MEMO** ☆

EXPLODED VIEW-1

Ref. No.	Part No.	Description
A	87-343-095-21	UT_2+3-8
B	87-351-095-21	VT_1+3-8
C	87-351-097-21	VT_1+3-12
D	87-081-511-01	$VTT+3-6$
E	87-511-094-21	VFT_1+3-6
F	87-513-095-21	VFT_2+3-8
G	87-081-531-01	$QTT+3-6$
H	87-251-169-21	$U+4-6$
I	87-341-074-01	$UT_1+2.6-8$



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P.C.B-J
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S951
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P.C.B-C
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Z only
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P.C.B-K

PARTS LIST

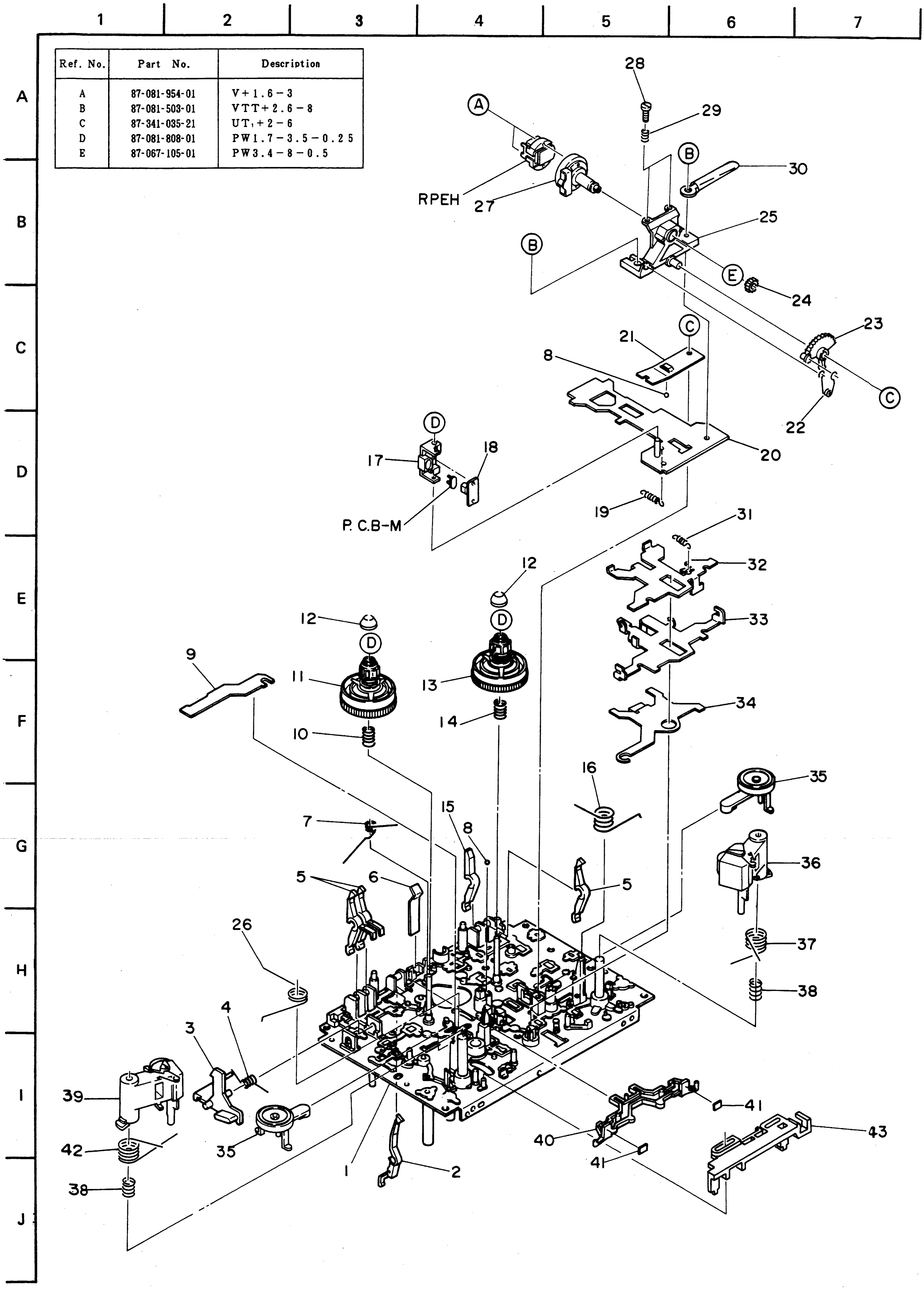
MECHANICAL PARTS LIST

● ★-mark means less required items and availabilities may be limited.

Part No. changed to	Ref. No.	Part No.	Description	Common Model	Q'ty
	1-1	82-197-008	CASSETTE BOX	FX-90	1
	1-2	★82-135-010	CASSETTE PLATE R	※	1
	1-3	★82-135-011	CASSETTE WINDOW R	※	1
	1-4	★82-192-218	P-SPRING. CASSETTE HOLDER	FX-30	2
	1-5	★82-135-210	T-SPRING. EJECT		1
	1-6	★82-135-002	FRONT CABINET	※	1
	1-7	★82-135-004	FRONT PANEL R		1
	1-8	82-192-040	KNOB B	FX-30	1
	1-9	★82-135-005	FRONT PANEL FR	※	1
	1-10	82-194-005	KNOB. REC	AD-F330	1
	1-11	★82-194-012	GUIDE. VR	AD-F330	1
	1-12	82-194-006	KNOB. BALANCE	AD-F330	1
	1-13	★82-135-007	TOUCH-KEY. STOP C	※	1
	1-14	★82-199-009	TOUCH-KEY. PLAY	AD-R550	1
	1-15	★82-648-025	LABEL. TAPE INDICATION	HS-F01	1
	1-16	★82-135-003	FRONT PANEL L	※	1
	1-17	★82-135-006	METER. WINDOW	※	1
	1-18	★87-040-172	COUNTER		1
	1-19	82-135-013	KNOB. TIMER	※	2
	1-20	★82-135-014	BOTTOM COVER	※	1
	1-21	★82-135-206	GUIDE. LED	※	1
	1-22	★87-081-903	STOPPER RING. CS-2		1
	1-23	★82-135-209	C-SPRING. EJECT		1
	1-24	82-135-008	EJECT KNOB		1
	1-25	★82-683-212	HOLDER. OIL-DAMP		1
	1-26	★82-175-207	OIL-DAMP BEARING	AD-3500	1
	1-27	★82-534-264	GEAR. OIL-DAMP		1
	1-28	82-188-012	KNOB. POWER		1
	1-29	★87-055-055	FOOT		4
	1-30	★82-199-012	STEEL CABINET	AD-R550	1
	1-31	★87-085-083	NYLON RIVET 3−5.5 (HB. HUB. HJB only)		2
	1-32	★82-542-209	BELT. COUNTER		1
	1-33	★82-197-203	HOLDER. MECHANISM	FX-90	1
	1-34	★82-135-218	SLIDE VOLUME R	※	1
	1-35	★82-135-208	SLIDE VOLUME L	※	1
	1-36	★82-135-207	HOLDER. CIRCUIT BOARD	※	1
	1-37	★82-135-205	ROD. B/C	※	1
	1-38	★82-135-012	PUSH-BUTTON. DOLBY	※	2
	1-39	82-135-204	ROD. ON/OFF	※	1
	1-40	★87-085-102	NYLON RIVET 3.5−5.5 (Z only)		4
	1-41	★87-085-184	CORD BUSHING (HB. HUB. HJB. CB only)		1
		★87-085-185	CORD BUSHING (EB. KB. GB. Z only)		1
	1-42	★87-034-958	AC POWER CORD (HB. HUB. HJB only)		1
		★87-034-578	AC POWER CORD (CB only)		1
		★82-187-797	AC POWER CORD (EB. Z only)	AD-3150	1
		★82-187-796	AC POWER CORD (KB only)	AD-3150	1
		★82-187-795	AC POWER CORD (GB only)	AD-3150	1

EXPLODED VIEW-2

Ref. No.	Part No.	Description
A	87-081-954-01	V+1.6−3
B	87-081-503-01	VTT+2.6−8
C	87-341-035-21	UT_1+2−6
D	87-081-808-01	PW1.7−3.5−0.25
E	87-067-105-01	PW3.4−8−0.5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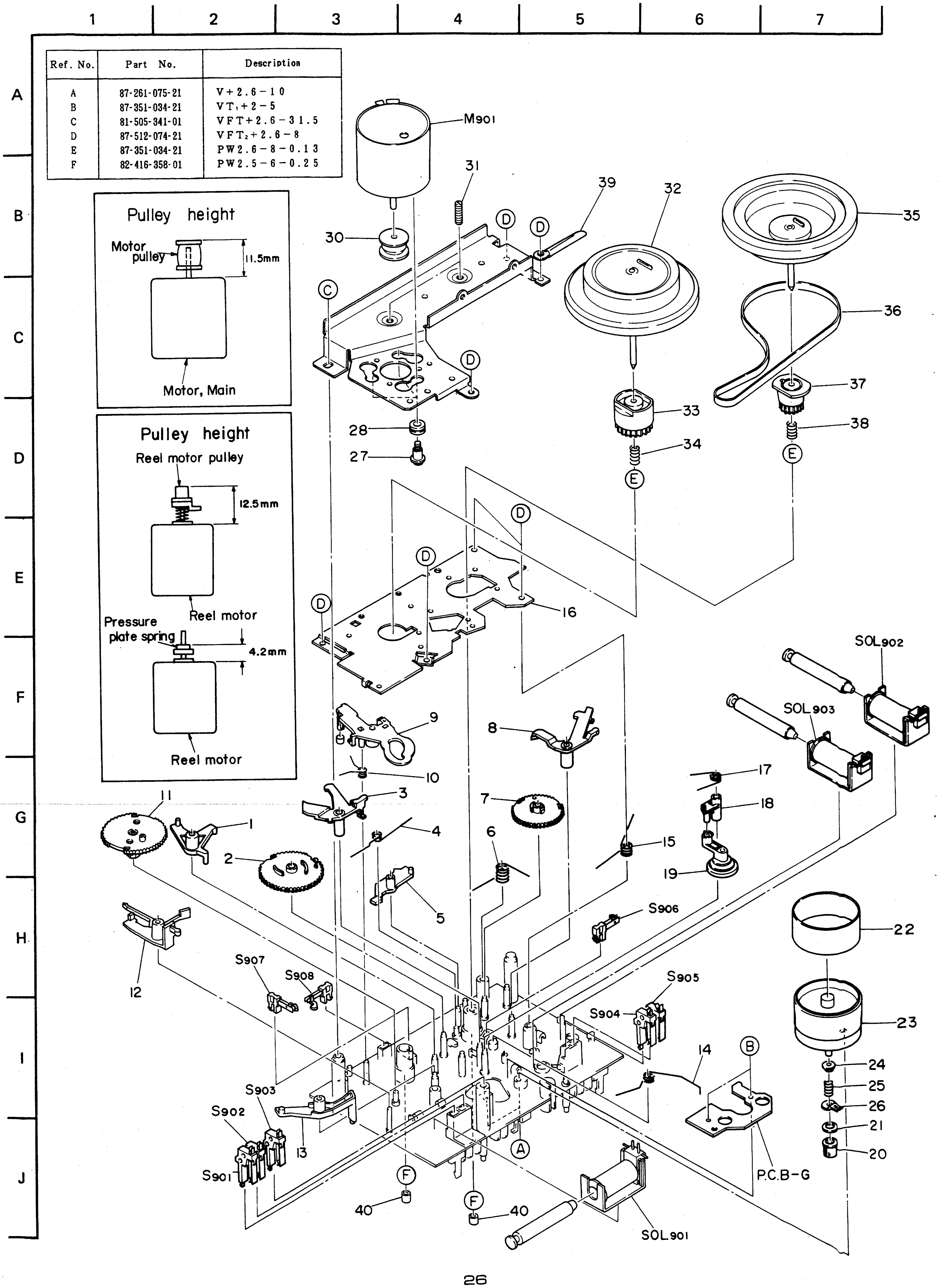
Part No. changed to	Ref. No.	Part No.	Description	Common Model	Q'ty
	2-1	★81-506-201	OUTSERT CHASSIS Ass'y		1
	2-2	★81-505-242	LEVER, METAL		1
	2-3	★81-505-239	EJECT, LEVER		1
	2-4	★81-505-273	T-SPRING, LID LOCK		1
	2-5	★81-505-241	REC BLOCKING LEVER		3
	2-6	★81-505-260	P-SPRING, CASSETTE HOLDER		1
	2-7	★81-505-268	T-SPRING, SLIDE BLAKE		1
	2-8	★87-073-005	STEEL BALL		2
	2-9	★81-505-238	BLOCKING PLATE, EJECT		1
	2-10	★81-505-274	C-SPRING, SUPPLY REEL PLATFORM		1
	2-11	★81-506-239	SUPPLY REEL PLATFORM RP Ass'y		1
	2-12	★82-303-398	CAP, TAKE-UP REEL PLATFORM		2
	2-13	★81-506-240	TAKE-UP REEL PLATFORM FP Ass'y		1
	2-14	★81-506-227	C-SPRING, REEL PLATFORM		1
	2-15	★81-505-240	LEVER, CASSETTE SENSOR		1
	2-16	★81-505-270	T-SPRING, IDLER LEVER		1
	2-17	★81-506-236	GUIDE, TAPE		1
	2-18	★81-506-274	GUIDE, LIGHT		1
	2-19	★81-505-265	E-SPRING, ACTUATING CHASSIS		1
	2-20	81-506-238	ACTUATING CHASSIS Ass'y		1
	2-21	★81-507-224	P-SPRING, ACTUATING CHASSIS		1
	2-22	★81-506-348	T-SPRING, SEGMENT		1
	2-23	★81-506-219	GEAR, SEGMENT		1
	2-24	★81-506-237	GEAR, HEAD HOUSING		1
	2-25	★81-506-319	HEAD BASE Ass'y		1
	2-26	★81-506-220	T-SPRING, IDLER LEVER R		1
	2-27	★81-506-208	HEAD HOUSING Ass'y		1
	2-28	★81-506-230	ADJUST SCREW, AZIMUTH		2
	2-29	81-506-293	C-SPRING, AZIMUTH		2
	2-30	★87-038-056	WIRE BINDER		1
	2-31	★81-505-266	E-SPRING, PAUSE PLATE		1
	2-32	★81-506-301	PLATE, PAUSE		1
	2-33	★81-506-281	PLATE, PINCH LEVER R		1
	2-34	★81-506-203	SELECT LEVER, PINCH ROLLER		1
	2-35	★81-505-344	IDLER LEVER Ass'y		2
	2-36	★81-506-275	PINCH LEVER FG Ass'y		1
	2-37	★81-506-222	T-SPRING, PINCH FG		1
	2-38	81-506-311	C-SPRING		1
	2-39	★81-506-276	PINCH LEVER RG Ass'y		1
	2-40	★81-505-236	LEVER, SLIDE BRAKE		1
	2-41	81-505-237	FELT		2
	2-42	★81-506-223	T-SPRING, PINCH RG		1
	2-43	★81-506-215	SLIDE LEVER, HEAD SELECT		1

EXPLODED VIEW-3

Ref. No.	Part No.	Description
A	87-261-075-21	V+2.6−10
B	87-351-034-21	VT_1+2−5
C	81-505-341-01	VFT+2.6−31.5
D	87-512-074-21	VFT_2+2.6−8
E	87-351-034-21	PW2.6−8−0.13
F	82-416-358-01	PW2.5−6−0.25


1
2
3
4
5
6
7
A
B
C
D
E
F
G
H
I
J
Pulley height
Motor pulley
11.5mm
Motor, Main
Pulley height
Reel motor pulley
12.5mm
Reel motor
Pressure plate spring
4.2mm
Reel motor
M901
31
39
32
35
30
D
D
C
D
36
37
33
38
28
34
27
E
E
D
D
D
16
SOL902
SOL903
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17
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6
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2
19
5
S906
22
12
S907
S908
S905
S904
23
14
B
24
S903
25
26
S902
13
21
A
20
S901
F
P.C.B-G
J
F
40
40
SOL901

Part No. changed to	Ref. No.	Part No.	Description	Common Model	Q'ty
	3-1	★81-505-230	PLAY LEVER		1
	3-2	★81-505-234	GEAR, PLAY CAM		1
	3-3	★81-505-231	TRIGGER LEVER, PLAY		1
	3-4	★81-505-272	T-SPRING, CAM		1
	3-5	★81-505-232	PAUSE LEVER		1
	3-6	★81-505-283	T-SPRING, PAUSE LEVER		1
	3-7	★81-505-235	GEAR, PAUSE CAM		1
	3-8	★81-505-233	TRIGGER LEVER, PAUSE		1
	3-9	★81-506-214	REVERSE LEVER		1
	3-10	★81-506-221	T-SPRING, REVERSE LEVER		1
	3-11	★81-506-241	GEAR, REVERSE		1
	3-12	★81-506-242	TRIGGER LEVER, REVERSE		1
	3-13	★81-506-216	LEVER, ACTUATING CHASSIS		1
	3-14	★81-505-269	T-SPRING, PINCH PLATE		1
	3-15	★81-505-271	T-SPRING, TRIGGER LEVER		1
	3-16	★81-505-204	MECHANISM CHASSIS B		1
	3-17	★81-505-282	T-SPRING, FR IDLER		1
	3-18	★81-505-254	IDLER LEVER FR A		1
	3-19	★81-505-301	FR IDLER Ass'y		1
	3-20~26	09-047-198	REEL MOTOR Ass'y		1
	3-27	★87-081-483	MOTOR SCREW, M2.6		3
	3-28	★87-087-029	RUBBER CUSHION		3
	3-29	★81-506-202	HOLDER, MOTOR		1
	3-30	★82-565-334	MOTOR PULLEY		1
	3-31	★82-565-373	THRUST SCREW		2
	3-32	★81-506-287	FLYWHEEL RB Ass'y		1
	3-33	★81-506-243	GEAR, FLYWHEEL		1
	3-34	★81-506-228	C-SPRING, FLYWHEEL R		1
	3-35	★81-506-205	FLYWHEEL F Ass'y		1
	3-36	81-506-229	RUBBER BELT, 3H		1
	3-37	★81-505-225	GEAR, FLYWHEEL		1
	3-38	★81-505-261	C-SPRING, FLYWHEEL F		1
	3-39	★87-038-039	WIRE BINDER		1
	3-40	81-505-246	RUBBER, DRIVE		2

■ACCESSORIES/PACKAGE LIST

Part No. changed to	Ref. No.	Part No.	Description	Common Model	Q'ty	
	1	82-135-901	BOOKLET, INSTRUCTION	※	1	
	2	★87-049-137	SIEMENS PLUG (H, HJ only)		1	
	3	★87-034-978	CONNECTION CORD CW-254BSK		2	
	4	82-135-851	BOX, GIFT (H, HU, C, K, G, Z only)	※	1	
		82-135-854	BOX, GIFT (HJ, E only)	※	1	